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THE WEIGHING OF MARKET HAY.

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A better understanding is needed among those interested in the marketing of hay as to the weighing methods in use throughout the country. It is the purpose of this bulletin to describe the various methods and practices now in use, so that the merits of all may be studied and compared in order that those methods which are an improvement over others may be adopted for the improvement of marketing facilities, and that careless, inefficient, and unprofitable practices may be discontinued.

There are four general methods of weighing hay. These are by the bale, by the truckload on hand trucks, by the wagonload or motor truckload, and by the carload, but for each method there are numerous variations caused by the use of various kinds of scales, the manner in which the weights are obtained, and the method by which they are recorded and preserved for future reference.

WEIGHING BY THE BALE.

Weighing hay by the bale is practiced principally by producers and balers in certain sections of the country, the timothy-producing sections of Michigan and New York probably being the most representative. Hay is sometimes weighed by this method in terminal markets, where tagged weights are recognized as official[1] or when

[1] By "official" is meant that the agency, by whose authority the certificate is issued, guarantees the correctness of the statements contained therein and assumes the liability for any loss or damage which may be caused by any errors on the part of its agents.

it is desired to weigh only a few bales from a carload to check up or verify the weights shown on the tags. Retailers of hay also frequently weigh hay by the bale.

Small platform or dormant scales having a weighing capacity of from 500 to 800 pounds are commonly used. The dormant scale is used only when the bales can be weighed in a warehouse, as it can not be moved about and is therefore not practicable for other locations.

WEIGHING AT TIME OF BALING.

In some sections hay is almost always weighed when baled, in order that the baler may know for how much hay he should make a charge for baling. He usually owns his scales and carries them along with the baler from place to place. It often happens that the scales are very much jolted in moving and sometimes will not weigh correctly after being set up again. While the error may not amount to more than 2 or 3 pounds in one bale it will make a considerable difference in the weight of a carload. Scales should always be handled carefully while being moved and should always be adjusted, balanced, and tested in some reliable manner before another lot of hay is weighed upon them. Perhaps the simplest and easiest way by which small platform scales may be tested is with a 50 pound test weight. Such test weights are manufactured by most scale companies and may be obtained at a small cost.

RECORDING THE WEIGHTS.

It is as important that the weight be correctly read and carefully recorded as that the scale weigh accurately. It is the practice in some sections to use only the numbers ending in 0 and 5 when weighing bales of hay. This is sometimes designated as the "give and take" method and consists in giving the weight designation to the number ending in 0 or 5 nearest to the actual weight. For example: The weight of a bale weighing 107 pounds would read 105 pounds, while if it weighed 108 it would be called 110 pounds. It is claimed that in weighing a large lot of hay, a wagonload or a carload, the total of the weights will be approximately correct, but it has been found that this is not an established fact and that weights obtained by this method frequently vary from 25 to 50 pounds on a ton of hay. The difficulty seems to be that the weigher "takes" more often than he "gives." To be really accurate the actual weight as shown by the scale should be recorded.

METHODS OF RECORDING WEIGHTS.

Bale weights are recorded on tally sheets or on tags, the latter being attached to the bale. When it is desired to have only the total weight of a lot of hay the weights are generally listed on a tally sheet

as the bales are weighed, and when the weighing is finished these amounts are added to obtain the total weight of the hay. To avoid errors the weight of every bale should be tabulated and the number of drafts should be checked with the number of bales weighed.

Tags upon which the weights of the bales of hay have been placed are used for recording weights when it is desired that knowledge as to the weight of each bale shall be available to the various agencies interested in the marketing of the hay. These tagged weights are frequently used through all the transactions connected with the marketing of the hay. Each person who wishes to know the weights of a given number of bales copies the amounts from the tags onto his tally sheets, from which total weights may be obtained.

KINDS OF TAGS USED.

Various kinds of tags are used, varying from a piece of paper to a small piece of wood (see fig. 1). Cardboard or a heavy stock of paper similar to that used for shipping tags is most frequently employed, and the size of the tags varies from that of a strip about 1 by 2 inches to a piece about 2 inches square. Some tags of standard size and quality are found, but the greater number are still cut from any available material by the producer, baler, or dealer who tags the hay. In some sections small wooden tags similar to those used in marking trees and shrubs for shipment are used instead of paper, as they are more substantial and can be more easily attached to the bale. New York and some other States have laws regulating the size of the tags. Such laws were found necessary because of abuses in the use of wooden tags. Occasionally large pieces of wood or small slabs weighing one or more pounds were found, which added materially to the weight of the bale.

ATTACHING THE TAGS.

Tags are attached to the bales by placing them under one of the baling wires. The hay hook used for handling the hay is usually forced under the wire, which is pulled away from the bale sufficiently to allow the tag to be placed under it. The hook is then removed and the tension of the wire holds the tag in place.

It is better to place the tag on the end of the bale, because in that position it is not so likely to be torn off in the handling of the hay. It is more difficult, however, to place it on the end of the bale, because of the great pressure of the hay against the wires at that point, and it is therefore more often placed upon the side of the bale. It has been stated that, while a few tags are lost in handling, if the hay is well baled and the tags are carefully attached but little diffi-

culty is experienced from the losing of the tags, whether placed upon the sides or the ends of the bale.

OTHER USES OF TAGS.

Besides being used for designating the weights of the bales, tags are sometimes used for advertising purposes and for grade or quality

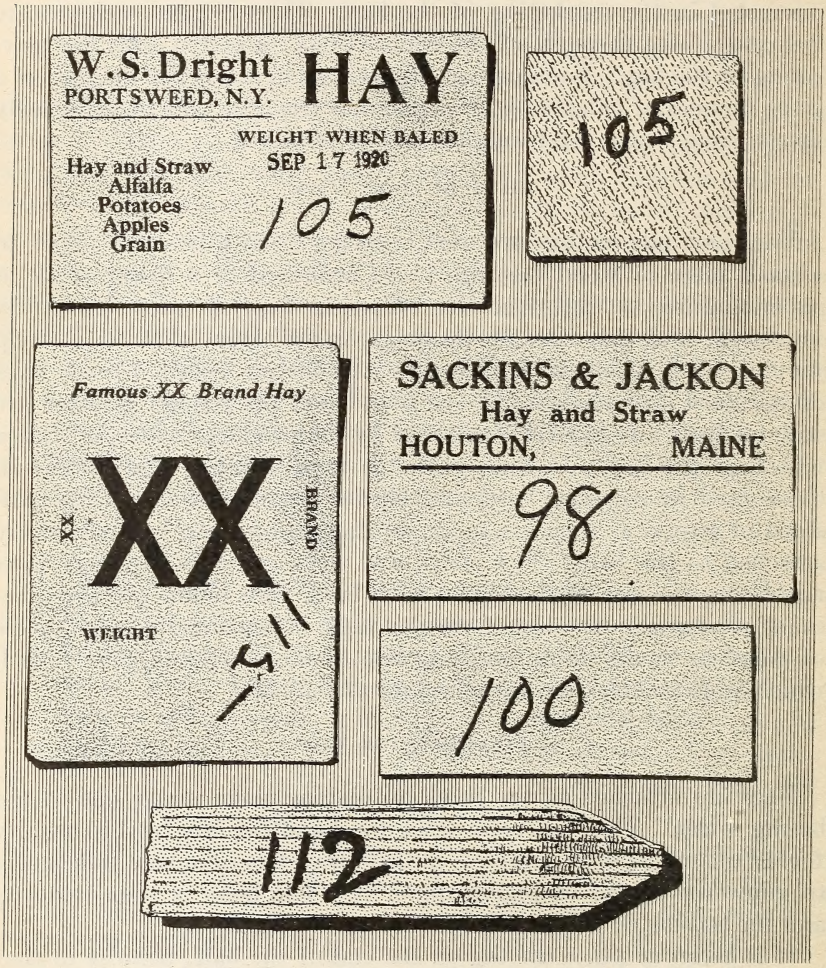

Fig. 1.—Types of tags used in various sections for tagging the weight of bales of hay.

designations. Producers and dealers who wish to become identified with the hay they produce or ship frequently have name and address printed upon the tags. They consider this good advertising, as they reach a number of prospective purchasers of hay at very small expense.

Other handlers of hay use the tags as a means of denoting the quality of the hay as well as the weight. This is usually done when the shipper makes a specialty of a certain kind or grade of hay. He uses a trade name or brand to represent the kind of hay handled, such as "Alpha Brand" or "Omega Brand," and generally endeavors to have the quality of the hay uniform and equal to a certain recognized grade. The purpose of this "branding" and of the use of the name on the hay is to build up a demand for the hay marketed by the shipper. Both are effective methods of advertising, providing the producer or shipper is able and willing to maintain the standard of the output. Any deviation from the standard claimed, however, would be as widely advertised (and probably more so) as a continued adherence to it.

In some States balers are required by law to place a tag upon every bale, giving the weight of the bale and the name and address of the baler. In these States the balers are usually the weighers of the hay, and the purpose of the regulation is to enable the sealer of weights to know who is responsible for any incorrect weighing of the hay. The letter of this law is not always followed, however, for the dealer handling the hay often has his own name placed upon the tag as the baler or weigher. In such instances the person actually doing the weighing becomes the agent of the dealer and the dealer therefore becomes liable under the law for the correctness of the weights.

The reason for not having the baler's name appear upon the tag is usually the desire of the dealer to prevent the ultimate buyer of the hay from establishing business relations direct with the baler. However, there are various other reasons, such as the desire for uniformity of tags, for using the tags as an advertising medium, etc., which may cause the dealer to take upon himself the responsibility for the correctness of the weights.

The date on which the hay is weighed is not entered on the tag, but the Bureau of Markets believes that such a date is desirable, as it would be of great assistance in determining when the hay should be reweighed.

VARIOUS PRACTICES AFFECTING TAG WEIGHTS.

When hay is weighed correctly by the bale and care is exercised in marking the weight upon the tags and in attaching them to the bale little difficulty is experienced with bale or tag weights. There are, or have been, certain practices, however, which tend to make bale or tag weights unreliable and unsatisfactory. Probably the most important of these is careless weighing. The bales are placed upon the scales, the poise weight is moved along the beam hastily until

the beam begins to rise or fall (whichever the case may be), but the bale is removed or pushed off the scale to make room for another before the beam comes to a balance. Such weights may easily be incorrect to the extent of from 5 to 10 pounds. The argument in defense of this practice is that while some bales will be overweight, probably a like number will be underweight, so that the total weight of the whole lot will be approximately correct.

Another practice which does not insure correct weights is that of weighing a few bales, usually from 10 to 25, and using their average weight to compute the weight of the entire lot. This is not only the practice of some balers, but is a recognized method of weighing in some of the larger terminal markets.

It is claimed that in some markets if, when making this test weight, it is found that the bales actually weigh more than is indicated on the tags, the tag weights are used as the official weight. One instance is related where a shipper whose returns from a terminal market were always a few hundred pounds short of his invoiced weights hit upon the plan of marking the weights on the tags of a few bales near the doorways a few pounds less than the actual weights, his thought being that when it was found that the actual weights were more than the amount indicated on the tags, the invoice weight supposed to be computed from the tag weights would be accepted, and he therefore would be paid the full amount of his invoice.

The careless or improper marking of the tags causes considerable trouble and loss to handlers of hay and should be discontinued. The most flagrant practice is probably that of marking the tags before the time they are to be used. The numbers placed upon the tags are those supposed to represent approximately the weights of the bales made by the press that will bale the hay. Sometimes a few of the first bales pressed are weighed and the tags for these and the remainder of the hay are marked from these weights. In the latter instance the weight on the tags would become average weights similar to those obtained in the terminal markets by weighing a few bales from each car. The difficulty, however, is that the bales may not run uniform throughout the carload, but may vary as much as 25 pounds, because it is frequently necessary to loosen or tighten the tension on the bales as hays varying in texture or moisture content are being baled.

PROPER METHODS OF WEIGHING BY THE BALE.

To weigh hay correctly by the bale it is necessary:

First, to have reliable scales in good condition and in balance (see fig. 2).

Second, to weigh each bale carefully, making sure that it is properly placed on the scales and is not in contact with other bales or objects.

Third, to have the beam come to a balance before the weight is determined or the bale removed. The actual weight should be recorded, and if the bale is to be tagged the actual weight should be marked plainly upon the tag. It is no more difficult to place the actual weight upon the tag than a weight ending in 5 or 0, for if the

FIG. 2.—Weighing hay by the bale. Hay should be so placed on the platform that it does not touch other parts of scales, and the beam should be allowed to come to a balance.

bale has been properly weighed the actual weight is shown on the beam.

Fourth, a tag should be attached as securely as possible to the bale and should be of material of such durability as will stand handling and shipping (fig. 2).

WEIGHING AT WAREHOUSES.

At many country points and at most of the terminal markets there are warehouses in which hay is stored and from which it is later shipped or hauled out by wagon or truck. When the hay is weighed

into these warehouses three types of scales are used—the platform scale, the dormant scale, and the steelyard. The first two are in very common use, but the latter is now used only in cotton sections, where cotton is stored extensively in the same warehouse.

When the platform scale is used the hay is usually weighed one bale at a time in the manner already described, but as most of the hay in the warehouses is weighed while being taken in or out, the dormant scale can be used to the best advantage, as the hay can be weighed while on the hand trucks en route to the car or warehouse.

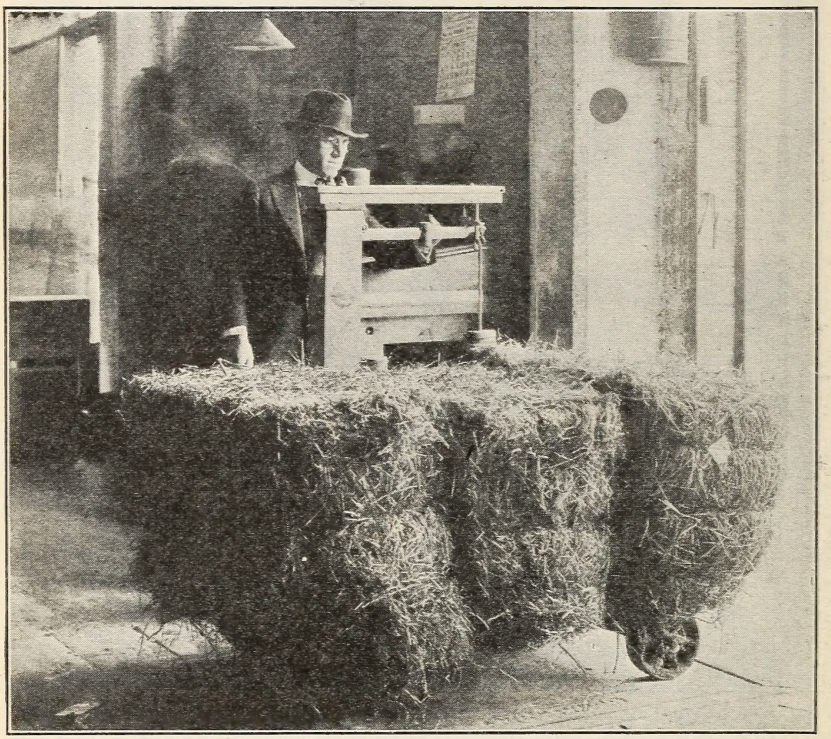

FIG. 3.—Weighing on dormant warehouse scales. Trucks are usually used when weighing on such scales, and care should be taken to see that tare weights of all trucks used are uniform and that proper tare is allowed.

WEIGHING ON THE DORMANT PLATFORM SCALE.

Hand trucks hold from 3 to 5 or more of the medium-sized bales, but those holding 3 such bales are the more generally used, as they are more convenient to handle and to load and unload. When two or more trucks are used at any one warehouse they are usually standardized as to weight and that amount of tare weight is set upon the scale beam. This facilitates the weighing, as the weight then indicated by the poise weight on the beam when it comes to a balance is the net weight of the hay. This method of weighing hay has been adopted

as the official method in several of the large markets and rules designed to make it accurate and reliable have been adopted by the various exchanges and boards of trade.

The most important provisions of these rules are those relative to the balancing and adjusting of the scales, the correct allowance for the weight of the trucks, the correct weighing of each draft, the proper tabulation of the weights, the accurate totaling of the number of bales weighed and of the weights of all the drafts, and the transmission of the official weights to the proper officers.

FIG. 4.—Improper method of weighing hay on trucks. The trucker should place the truck on the scale and remain away from it while it is being weighed.

BALANCING AND ADJUSTING THE SCALES.

When official weights are to be obtained it is usually required that the scales be examined to see that they are in order, are free from dirt or other obstructions, and are in balance. They should also be tested frequently with one or more of the standard 50-pound test weights.

After the scales are balanced and adjusted the trucks are weighed and adjusted until their weight is uniform. The weights of the trucks are adjusted to uniformity, usually by adding or taking off a washer or two usually kept at hand for that purpose. It frequently happens, however, that nails or bolts are used in making the adjustment, and a sufficient number are tied to the frames of the various trucks until all are of equal weight. When all are found to weigh

the same amount the tare weight is set at the proper amount and the scales are ready to begin the weighing of the hay (fig. 3).

WEIGHING THE DRAFT.

As the hay is trucked onto the scales, 3 or more bales at a time, the weight is determined and the amount is placed upon a tally sheet. While frequently 5 or even more bales are placed upon the trucks at some warehouses, the number is usually the same for each truck during the weighing of any lot of hay.

FIG. 5.—Weighing on wagon scales. Much hay is now weighed on trucks and care should be taken to see that the truck is properly located on the scale and that the driver is either on or off when obtaining both the gross and tare weight. It is considered the better practice to have the driver always off the load while weighing.

The trucks are wheeled upon the scale and are usually set down, so that all bearing points are upon the scale. Instances have been noted, however, where the trucker balanced the truck on the scales upon the wheels so that it would not be necessary to lift the truckload again when it was desired to wheel it away after being weighed. Weights obtained in this manner are very likely to be inaccurate, and the practice should not be allowed in obtaining either official or unofficial weights (fig. 4).

Only when the truckload of hay has come to rest upon the scales should it be weighed. The poise weight should then be carefully moved upon the beam until the beam comes to a balance.

TABULATING THE WEIGHTS.

The weight is then placed upon the tally sheet, and this should be done before anything else has an opportunity to distract the attention of the weigher. To prevent errors from this and similar causes the tally sheets are sometimes arranged so that the weights may be tabulated in groups corresponding to the tiers of hay loaded into the cars. If care is taken in unloading the hay from the car and the weigher is notified by the truckers when each tier or section of the car is completed, the tabulation may be checked with the number of bales in the tiers as unloaded and the chances of errors greatly diminished. It is almost necessary to use some system of checking if the weights are to be tabulated correctly. A form for a tally sheet which will meet these requirements is shown on page 12.

TOTALING THE WEIGHTS.

After all the hay has been weighed, the weights of all the drafts are totaled and this is the weight of the lot or load of hay. In several of the important hay markets inspectors or supervisors appointed by the commercial trade associations make frequent visits to the warehouses when hay is being weighed and inspect and check up the work of the weighers, assist in totaling the weights, and in some instances collect the tally sheets for the hay and take them to the office of the chief weighmaster.

In markets where no supervisor is employed the tally sheets are mailed, usually each evening, to the office of the chief weighmaster, who issues an official certificate of the weight as shown by these tally sheets. If the lot of hay weighed was a carload the initial and number of the car from which the hay was taken or into which it was loaded is shown on the tally sheet and on the official certificate. If the lot was less than a carload some other means of identification, such as the number of bales or the quality of the hay or the name of the owner, may be used.

When hay is weighed on dormant platform scales at warehouses located at country shipping or distributing points where there are no official weighers or supervisors the same general methods are used as at the terminal markets, but frequently no special forms of tally sheets are used and the weights are recorded in shipping books or notebooks or on anything that may be at hand.

It is thought that some of the difference between shippers' and receivers' weights of the same lot or carload of hay is caused by carelessness in the matter of recording the weights. A draft may be omitted or the weights may be tabulated in such a careless manner that the number of bales or drafts can not be checked or the total correctly obtained. Whoever is responsible for the weighing

TALLY SHEET.

(Small drafts.)

..... 192–..
(Place.)

..... weigher.

Size of bales .....

Car initial .....

Car number .....

Seal numbers .....

Doorway.		Brake end.										Opposite end.									
		First tier.		Second tier.		Third tier.		Fourth tier.		Fifth tier.		First tier.		Second tier.		Third tier.		Fourth tier.		Fifth tier.	
Number bales.	Weight.	Number bales.	Weight.	Number bales.	Weight.	Number bales.	Weight.	Number bales.	Weight.	Number bales.	Weight.	Number bales.	Weight.	Number bales.	Weight.	Number bales.	Weight.	Number bales.	Weight.	Number bales.	Weight.

Total bales .....

Total weight .....

of a lot of hay owes it to the other interested parties to so safeguard the weighing and tabulation that he can be certain the weight obtained is correct.

WEIGHING ON WAGON SCALES.

In some hay-shipping sections practically all the hay shipped is weighed by the wagon or truckload on wagon scales. This method of weighing is used extensively also at terminal markets and in distributing sections.

AT SHIPPING POINT.

Some of the factors to be considered in the use of wagon scales at shipping points are the size and capacity of the scale, location, and general condition. Wagon scales may differ somewhat in construction, but the principal factors that might affect the accuracy of the weights are the size of the platform and location of the scale.

The platforms of most of the farm scales and of many others are about 14 feet long. This is sufficient length to allow for the weighing of almost any wagonload without the team, but unless the team is unhitched from the wagon while the draft is being weighed more accuracy in weighing could be obtained on scales with a platform of sufficient length to hold both the wagon and the team.

The capacity of the wagon scales generally used varies from 2 to 10 tons or more. The 5-ton scale is used extensively, but since the advent of the motor truck, scales of larger capacity are more desirable. When loads of greater length or weight than the length or capacity of a scale are to be weighed it is often the practice to weigh one-half of the load at a time. This is done by drawing first one end of the truck or wagon onto the scales and weighing it, then the other end and adding the two weights, taking the sum as the total weight. This is not a desirable practice, because any unevenness of the ground will throw the load out of level and the weight then will not be accurate.

The location of the scale is also an important factor. It should be located at a well-drained and easily accessible place, preferably in an inclosed building which will protect it from unfavorable weather. Some scales are said not to require a foundation, but whether it is a scale supposed to require a foundation or not, it will give better service if placed solidly upon a concrete or masonry base that will prevent the corners or any part of the frame from getting out of level. Care should be taken that all bearings work freely and that the platform does not bind or come in contact with the frame. Loose hay and trash should be kept swept away from the scale, and if there is a pit under the scale it should be well drained and kept free from dirt. The approaches to the scale should be nearly level, with just enough incline to prevent the water from running toward the scale.

TESTING AND BALANCING THE SCALE.

The same care is necessary in testing and balancing the wagon scale as with the portable or dormant platform scale. Scales should be examined and tested frequently by an experienced scale man and they should also be kept in good repair and in balance. When scales are under cover and in a dry place they do not require balancing so frequently as when situated in the open, but considerable soil or trash may be carried upon them, especially when roads are in bad condition. At such times it is necessary to balance them several times a day, whereas in dry weather probably once each day would be sufficient. Scales located in the open must be balanced more frequently, especially in rainy weather, as they will absorb several pounds of moisture during a shower and will lose it again quickly when the sun shines upon them.

WEIGHING THE DRAFT.

To obtain the correct weight of a draft requires care and accuracy on the part of the weigher. In weighing hay, especially loose hay, the wagon must be entirely on the scale and the load must not be in contact with the sides of the scale house or beam box. Care must be taken that the presence of the team does not influence the weight. If a motor truck is used, it should be brought to rest in proper position on the scale, and if the running of the motor disturbs the weighing it should be stopped (fig. 5).

There should be a fixed rule as to whether the driver should be weighed with the load, but as a general practice it is better always to weigh the load without the driver or any other objects on it or on the empty wagon when the tare weight is taken. This will prevent any mistakes caused by the weigher forgetting what was weighed on or off the load. Numbers of instances have been found of errors caused by allowing loads to be weighed on which were farm implements, bags of grain, or other articles which were not on the truck or wagon when the tare weight was obtained.

TABULATING THE WEIGHTS.

It is as important that the weights be recorded accurately as that the hay be weighed correctly. At country loading points it is generally impossible to have a sworn weigher in charge of the scales, and the weighing is usually done by the owner of the scales or by one of his employees. The qualifications of the weighers in such instances are but ordinary intelligence, the ability to do the physical act of weighing, to read the amount indicated on the beam or by the weights, and to write the amount upon a scale ticket or book.

In many instances but little system is used in recording the weights and the amounts of the gross, tare, and net weight are written upon

any blank piece of paper, the unused part of an envelope, a shingle, or a piece of board.

A better method, however, which is in use at many country points, is the use of scale tickets in duplicate or a scale book in which the weights may be recorded on a stub for future reference as well as upon the tickets, which may be detached and given to the driver of the wagon or the owner or buyer of the hay.

At some points where considerable weighing is done registering-beam scales are now used. These scales differ from others only in the construction of the weight beam. These beams are so made that the entire capacity of the scale can be indicated on the beam and there is a mechanical device on the poise weight which will print upon a ticket inserted in it the amount of the weight indicated by its location on the beam. This device eliminates the possibility of misreading the weight indicated by the poise and other weights used on other scales, but it does not insure correct tabulation or totaling of the weights of the various drafts.

AT TERMINAL MARKETS.

Wagon scales at terminal markets do not differ from those used at shipping points, but where railroads, public-service agencies, exchanges, or other commercial bodies furnish official weight certificates for commodities weighed by them, certain qualifications, and frequently bonds, are required of the weighmasters, and their work is under the supervision of a chief weighmaster, who sees that the various regulations are complied with.

Official certificates are not necessarily more accurate or of more value than certificates issued by any financially responsible individual. Interested parties are protected against dishonest weights by law if they desire to avail themselves of its protection. Section 10 of the interstate commerce act provides that any person who, by an act of false weighing or false report of weight, shall be deemed guilty of a misdemeanor, and shall upon conviction thereof in any court of the United States of competent jurisdiction, within the district in which such offense was committed, be subject to a fine not exceeding $5,000 or imprisonment in the penitentiary for a term of not exceeding two years, or both, in the discretion of the court, for each offense.

Probably the reason official certificates are considered with more favor by the trade than private certificates is because more care by means of supervision and various regulations is usually taken to insure their correctness.

QUALIFICATIONS OF OFFICIAL WEIGHMASTERS.

The ability to read and write and to operate a scale are practically the only qualifications required of those who are appointed as official

weighmasters in the various markets. In some places where the scales are owned or maintained by the railroad companies, employees who have become incapacitated for other work are made weighers. Bond for the honest and faithful performance of duty is required of the weighmasters in some markets, while at others an oath is sufficient. Where supervisors are employed they must meet the same requirements as the weighmasters, except that in some instances they may be required to furnish a larger bond.

DUTIES OF WEIGHMASTERS.

Aside from the weighing duties, the weighmasters often have other duties which vary greatly in character. At railroad team tracks, where the weighing duties are not heavy, the weighmaster is often the yardman and polices the yard, together with keeping a record of the cars received at the yards and forwarded from them. He also directs the teams to the proper cars; in fact, looks after everything in connection with the freight received in the yard of which he has charge.

If the weigher is an employee of a warehouse owner he may also do any of the various duties connected with the business of his employer.

TIME AND WORK REQUIRED.

There are no fixed rules as to the hours or amount of work required that are applicable to all official weighmasters. The hours of work are usually those prevailing in the markets or territory in which the work is done. At the railroad yards it is often necessary for the weigher to be on hand at an early hour in order that he may check up the cars in the yards and learn the location of the various cars to be unloaded. These yards may then be closed at an early hour in the afternoon, or another weigher may come on duty at the expiration of the work period of the first weigher. The work periods now are generally about eight hours, but many weighers frequently work overtime and receive extra pay for the extra time.

OFFICIAL WEIGHTS AT TERMINAL MARKETS.

The official weighing of hay in the large markets is confined almost entirely to hay shipped to those markets, and a composite description of the various methods of weighing and the supervising of the weighing on wagon scales used at these markets is as follows: The owner or purchaser of the hay, or his representative, drives his team or truck to the scale nearest the car to be unloaded, which has been designated as a scale where official weights may be obtained, and presents to the weighmaster an order from the seller or owner for the hay. This is the weigher's authority to weigh the loads to be hauled

from the car. This order usually contains the car initial and number, together with the name of the buyer, and is signed by the seller.

At St. Louis, where the Merchants' Exchange maintains a supervisor at each team track scale where hay is weighed, this order is presented to the supervisor instead of the weighmaster. The supervisor, after making a record of it, issues another order, which contains the wagon number, the car number and initial, and the name of the buyer. This order is then presented to the weighmaster, who, after obtaining the tare weight, places that amount upon it and gives it to the driver. At most other markets the weigher, upon receipt of seller's order, weighs the empty wagon or truck and places the amount of the tare weight, together with the car initial and number from which the hay is to be taken, upon a weight ticket, which is then given to the driver.

Upon receiving the tare weight the driver proceeds to the car containing the hay which he is to haul, as shown upon the weight ticket, and proceeds to obtain a load of the hay. In several of the large markets an inspector is stationed at the wagon track yards whose duty it is to police them and to see that drivers obtain their loads from the proper cars. They indicate by a check mark or their initials on the weight ticket that this has been done. At some markets these inspectors are in the employ of the railroads and at others they are employed by the commercial exchanges. When the load has been obtained it is weighed on the same scales on which the tare weight was found, and this gross weight is then also placed upon the ticket taken by the driver with the load.

In all cases a copy of the weights is kept by the official weigher and is forwarded by him when the weighing of the car is completed, or at the close of the day, to the office of the chief weighmaster, who issues an official certificate for the total amount of the weights of each car.

Where supervisors are also employed the weighmasters usually turn over the weights to them, and they, in turn, after recording the amounts, forward them to the chief weighmaster.

WEIGHING FROM PRIVATE TEAM TRACKS.

Firms operating private warehouses or having private sidings and desiring to have official weight certificates issued for hay weighed by them usually have one of their employees designated as an official weigher. When such an employee is so designated he becomes subject to the rules and regulations of the weighing department of the commercial exchanges. In markets where bonds are required of the weigher he, or his employer, must furnish a bond of a specified amount for the proper performance of his duties. Some weighing departments have official weighers who can be furnished to the various private warehouses on request and can be sent from place to place as the need for them occurs.

The rules of the various exchanges usually provide that weighers at private warehouses may be changed from time to time at the option of the chief weighmaster. If he is an employee of the warehouse owner, he may be dismissed as an official weigher at any time that his services are not satisfactory to the chief inspector or in compliance with the rules and regulations of the weighing department or the exchange, but no regular system of rotation of weighers at warehouses has been reported at this time.

OBTAINING THE TOTAL WEIGHTS.

After all the drafts have been weighed the amounts of the various drafts are totaled. This work is done by one or more of several agencies, which vary at the different markets. In some instances the weights are totaled by the weigher, in others by the supervisor, or the figures denoting the amount of the various drafts may be sent to the office of the chief weighmaster, where all clerical work will be done.

At this point, investigations show, most of the systems of official weighing are weak. Complete information necessary for preparing an official weight certificate which would be fair to all parties concerned is frequently not furnished to the office of the chief weighmaster.

NUMBER OF BALES UNLOADED FREQUENTLY NOT GIVEN.

The item most frequently omitted is that stating the number of whole bales unloaded and the number of bales from which the wire may have been broken, or the amount of loose hay, if any (fig. 8).

The rules of most markets provide that the weighing charges shall be paid by the shipper, and it would seem therefore that the service was performed for his protection as well as for the protection of the buyer. There are several ways in which losses in weight may accrue between the time the hay is loaded into the car and when it arrives at its destination, but with the exception of shrinkage by loss of moisture or shattering all losses will be indicated by the difference between the number of bales loaded into the car at point of shipment and the number received at destination. It has happened that hay has been stolen from cars at point of shipment, en route, or while in the railroad yards at destination. The handling of the cars in switching or shipping has jarred open the doors and allowed some hay to fall out before the fact was noted and the door closed. Cars have been switched from unloading yards before all the hay has been taken out. Parts of carloads have been destroyed by fire and damaged by water during the process of unloading. The liability for such loss or damage is upon those responsible for it or in whose

possession the hay was when the loss occurred. It is usually customary, and in some cases necessary, for the shipper to present the claim for loss against the railroad, or other agency responsible for it, and he must have the proper facts to present with the claim in proof of its justness if he would be reimbursed.

The fact that fewer bales were unloaded from a car than were loaded into it, together with statements of the loading and unloading weights, is the strongest proof of a loss, and the shipper is entitled to, and should have, together with an official weight certificate, an official statement as to the condition of the car and the number of whole and broken bales or amount of loose hay unloaded from it. In a number of large markets it is not now possible to give such a statement, because no record is kept of the number of bales unloaded from the cars.

NUMBER OF DRAFTS SHOULD BE RECORDED.

A record of the number of drafts weighed from each car should also be furnished the chief weighmaster and all drafts from any carload should be weighed upon the same scale. An instance was noted recently in a large market which issues official certificates, of a claim by a shipper of a loss of about 9,000 pounds on one car of hay shipped to that market. An investigation disclosed the fact that the hay was weighed over two different scales and there seemed to be a strong probability that one draft was not weighed at all. Conditions making such practices possible should be eliminated, and it is thought that they could be eliminated by proper policing and weighing regulations.

THE WEIGHT CERTIFICATE.

Because of the difference in the weighing practices at the different markets the form and contents of the official weight certificates are not uniform. In most instances, however, the official certificates now in use give only the car initial and number and the total net weight of the hay (fig. 6).

The illustrations on pages 20 to 23 are copies of certificates used in several of the important markets. The reader will note that several do not state the number of bales weighed. Only one provides for the weight of the loose hay, and none of them contain all the information necessary for the preparation of a claim for a loss or shortage in weight.

Official certificates would be made of more value to those interested in them if more detailed information were given and if items which would better identify the hay were added.

NEW ORLEANS BOARD OF TRADE, LIMITED.

HAY INSPECTION AND WEIGHING DEPARTMENT.

CERTIFICATE OF WEIGHT of.....BALES HAY, weighed for account of M.....

Car No. and Initial..... Ex.....

Good..... Bales weighing.....pounds.

Old stained.....

Car stained.....

.....

.....

.....

New Orleans, La.....19... .....

Secretary.

FIG. 6A.

No.....

STATE CERTIFICATE OF WEIGHTS AND MEASURES. ORIGINAL.

AUSTIN, TEXAS.....

Weighed for.....of .....Texas, the following articles consigned or sold to..... of....., Texas. Weighing charges.....

Article.	Gross wt.	Tare.	Net wt.	Condition.	Remarks.

This is to certify that I have this day weighed the above described articles and that the weight and conditions, as set forth, are true and correct.

.....
Certified Public Weigher.

Driver on / off

By.....Deputy

Precinct No....., ...County.

FIG. 6B.

OFFICIAL CITY SCALES.
1605 Nineteenth Street.
BONDED.

W
T
Price.....

No. 2.

DENVER, COLO.....191..

.....

Load of..... Gross | | | | | | Lbs.

From..... Tare | | | | | | Lbs.

To.....

Net | | | | | | Lbs.

.....
Weigher.

FIG. 6C.

Car.	Wagon.	Destination.	Bales.	Gross.	Tare.	Net.

FIG. 6D.

CAIRO BOARD OF TRADE.

HAY DEPARTMENT.

OFFICIAL CERTIFICATE.

CAIRO, ILL.,.....

This is to certify that I have weighed the contents of car..... For ..... and found same to contain ..... pounds of hay.

Bales.	Grade.	Weight.
.....	.....	.....
.....	.....	.....
.....	.....	.....

Condition of car.

Roof.....

Doors.....

Sides.....

....., Weighmaster.

....., Deputy.

Seals .. { Side.....
Side.....

FIG. 6E.

WEIGHT CERTIFICATE

[ORNAMENT.] Issued by

KANSAS CITY HAY DEALERS ASSOCIATION

KANSAS CITY, MO., ... No.....

This certifies that our sworn and bonded Weighmaster weighed car as specified below at ..... from ..... Ry. and that the weights shown hereon are correct.

Consignee.	Car No.	Initials.	Contents.	Bales.	Weight.	Total weight.
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
	Broken bales av'g. wgt.					

Shatterings Estimated ..... lbs.
Not included in total weight.

.....
Weightmaster in charge.

FIG. 6F.

(ORIGINAL)

Department of Supervision of Weights, of the Merchants Exchange of St. Louis.

ST. LOUIS, ...

Office of
JOHN DOE,
Supervisor,
Merchants Exchange.

This certifies

that

.....

actually saw the weighing of the contents of

Car.....initial.....on the.....day of.....
Loaded at

.....

And the same contained

Lbs. of.....

Fee

.....Supervisor.

Side seals Side seals End

FIG. 6G.

Form 8-B

ORIGINAL

No. .....

OUT—OFFICIAL WEIGHT CERTIFICATE

CINCINNATI GRAIN AND HAY EXCHANGE

This certifies that CINCINNATI, OHIO, ...19..

Car..... No.....

was officially weighed by deputy weighman.....and that the weight is Weight gross.....lbs.

..... Tare.....lbs.

..... Net.....lbs.

..... Net.....lbs.

..... Net.....lbs.

Length of car.....feet. ..... Net.....lbs.

Marked capacity.....lbs. ..... Net.....lbs.

Condition of car.....Examined by.....Line delivered to.....

SEALS .....,

Side..... Weighmaster

Side.....

End..... By.....

FIG. 6H.

An official certificate should state the date of weighing, the initial and number of the car in which the hay arrived; the number of drafts in which the hay was weighed from the car; the size of the bales (stating the exact measurements, the number of wires, or the commercial size designation); the number and weight of the whole or unbroken bales; the number and weight of the broken bales; the weight of the loose hay; the name or title of official weighing the hay; and the official record number. A space should also be provided for noting the condition of the car. Such a certificate is shown on page 25.

All these items are essential if an official certificate is to serve as evidence of the outturn weights of a car of hay and conditions affecting them, and is to be used to substantiate claims for losses in weight that may occur some time during the course of marketing. Anyone interested in such claims is entitled to the necessary information, and it should be furnished on the official weight certificate for which a charge has been made, presumably of a sufficient amount to pay for adequate service (fig. 7).

.... 192..
Name of City. Date.

THIS IS TO CERTIFY THAT THE HAY contained in car .....

No. ..... was weighed this day by ..... and the correct weight was found to be as follows:

..... Whole bales: Gross.....lbs. Tare.....lbs. Net.....lbs.
Number.

..... Broken bales: " .....lbs. " .....lbs. " .....lbs.
Number.

Loose hay: " .....lbs. " .....lbs. " .....lbs.

Total net weight.....lbs.

Size of bales ..... Car weighed in ..... draughts.

Condition of car was as follows .....

Official record No. ....
Chief Weighmaster.

Official seal ( ). .....
Deputy Weighmaster.

Last date on which scales were officially tested .....

FIG. 7.—Form of official certificate which will provide necessary information upon which to base a claim for loss in weight.

WEIGHING ON RAILROAD TRACK SCALES.

There are no data available relative to the amount of hay weighed on railroad track scales, but such weights are used in some territories to a considerable extent. Railroads weigh shipments over their lines in order that proper freight charges may be assessed.

These track scales are maintained at convenient points which are designated as track scale stations and cars to be weighed are switched over the scales at these points and the weights obtained.

OBTAINING THE WEIGHT.

Methods of weighing the gross and tare differ slightly at different scales. The usual practice is to pull or push a train of several cars over the scales and to stop, as each car comes onto the scale, a sufficient length of time for the weigher to obtain the weight of the car. The car is sometimes uncoupled from the other cars at both ends, sometimes at only one end, but the most common practice is to stop the car on the scale with the slack taken up so that the coupling at either end does not bind with the couplings of the cars attached.

It is claimed that when the couplings do not bind cars can be weighed accurately by this method. The difficulty is that it is frequently impossible to stop cars so that couplings will be entirely free from the influence of the cars attached to them. There is also the danger during the rush of weighing that the car will not be brought

to a stop upon the scale and the weigher is then compelled to "catch" the weight as the car passes slowly over it. Weights obtained in this manner are likely to be inaccurate, are not fair to anyone concerned, and should not be used as official weights.

The correct way is to weigh the car standing still and uncoupled at both ends. As the scale track, when a car is on it, is lower than the track adjoining at each end, if the slack is taken up taut, especially in a long string of cars, the weight indicated will be less than the actual weight. Conversely, in a long string, with no slack taken up, the weight indicated will be greater than the actual weight.

Care must be taken also in weighing cars during a high wind, as the weight of a car may vary several hundred pounds between the highest and lowest pressure of the wind.

Some railroads have installed automatic weighing devices at scales where considerable weighing is done, which greatly facilitate the weighing and guarantee correct weighing if properly operated. The device or recorder is attached to the end of the weight beam and eliminates the use of the poise weight. The movement of the beam, which is regulated by balance weights in the mechanism, causes a wheel upon which weight designations are set in type to revolve until the number indicating the weight of the load is in position to print the amount upon a ticket.

Tripping levers are placed alongside the car rail at each end of the scale which indicate the passing of the car onto and off the scale and also operate the printing mechanism. Cars which are to be weighed are pushed upon the scale or rolled onto it from a slight incline or hump. A ticket is placed in proper position in the recorder mechanism. As the car passes clear of the first tripping device onto the scale, the beam comes to a balance automatically and the printing arrangement is released and stamps the weight in 100 pounds upon the ticket. As the car passes off the scale the second tripper is operated and sets the weighing attachment for the next car.

It is claimed that this weighing mechanism will weigh and record the weights accurately so long as the car does not pass over the scales at a speed greater than 5 miles an hour. It is necessary for cars to be free from each other, however, and unless the first car has passed the second tripping arrangement the following car can not be weighed.

THE TARE WEIGHT.

When cars are weighed by railroad companies the tare weights stenciled on the cars are usually used, as there is no opportunity to weigh the empty car. Railroad cars are weighed when put into service and usually after any extensive repairs have been made. New cars are also generally reweighed after they have been in service

for some time, when the material may have seasoned and dried out. The weights as found at such weighings are stenciled upon the side of the car and are used as the weight of that car until it is reweighed. Any repairs made by private shippers, any coopering that may have been done, any loss of doors or lining, or any other damages are not included in the stenciled weights. Snow or ice on the car will materially affect its weight, as will also excessive moisture.

It is therefore true that the stenciled weight frequently does not represent the current weight of the car, and net weights obtained when using stenciled weights may be incorrect to the extent of several hundred pounds. If stenciled weights are to be used as tare weights it should be known that no changes have been made in the car since it was last weighed and stenciled.

A more satisfactory method of weighing by railroads would be to have the scales located at terminal markets and the loaded cars weighed as they are being switched to the warehouses and the empty cars weighed as they are taken away. Care would still be necessary, however, to keep the cars as free from snow, ice, trash, and other encumbrances when weighing the empty car as when weighing the load.

The weighmasters at some railroad track scales estimate the weight of any snow or ice that may be on the cars and add that amount to the tare weight, together with an allowance of about 150 pounds for the brakeman on the car when it is allowed to roll onto the scale from a hump or incline. A tolerance of from 200 to 500 pounds is not considered excessive in this class of weighing, and it seems doubtful whether such weights are sufficiently accurate to be relied upon as a basis for invoices or for claims for shortages or overcharges.

The condition of the scales is also an important factor. Unless scales are kept in repair, free from snow and ice, and in balance, the weights obtained from them will not be accurate. Track scales are usually tested with a test car. This car consists of a collection of large test weights mounted upon a set of trucks and kept at a constant weight. Most railroad systems have a test car operating upon their lines continuously, which visits each scale about once each month. Heating systems are also installed at many of the modern railroad track scales which keep the scales dry and free from ice and snow.

PRIVATE TRACK SCALES.

While the greater part of the hay unloaded at warehouses is weighed over platform or wagon scales, a number of dealers and warehousemen have track scales at their warehouses, over which they weigh the commodities they handle.

The same rules relative to the care of the scales that apply to wagon scales apply to track scales. They should be kept free from trash, and if not under cover must be kept free from snow and ice. They

should be tested frequently and balanced daily, or even oftener, if weather or other conditions make more frequent balancings necessary.

At some warehouses scales are so placed that the car remains upon them while it is being loaded or unloaded; at others they are placed so that cars are moved over them when being switched to and from the warehouse. There is no material difference as to which location is used, but care must be taken to see that the car contains the same equipment when being weighed loaded and empty.

ACCURACY OF WEIGHTS.

All things considered, weights obtained on track scales in proper condition and located under cover are subject to fewer chances for error than weights obtained by any other method. The load is weighed in one draft, which overcomes the danger of omitting the

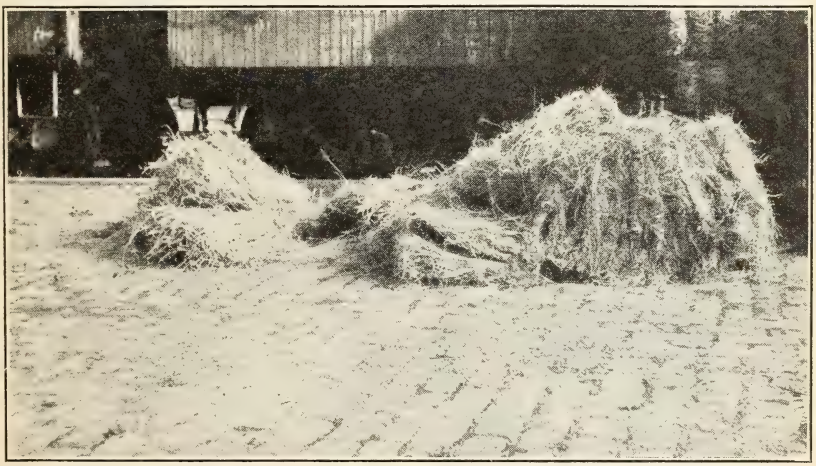

FIG. 8.—Broken bales, showing how losses may occur in terminal markets.

weights of any draft, as is possible when weighing on platform or wagon scales.

The tare is also obtained in one draft, frequently without any movement of the car from the time the gross weight was obtained, so that about the only chance of error is in tabulating the weight. If a registering beam is used, this chance of error also is eliminated.

Because of the great cost of track scales, however, and the fact that their use would be confined in most cases to one warehouse, they are frequently impracticable and generally can not be maintained, except by railroads or large concerns.

CERTIFICATES FOR TRACK SCALE WEIGHTS.

Certificates of weights for track scales should differ but little from other weight certificates, but since the weight is obtained in one

draft the number of drafts need not be shown. All other items are of equal importance, whether weighed upon platform, wagon, or railroad scales.

TYPES OF SCALES COMPARED.

It can scarcely be said that any type of scale properly adjusted and balanced is more accurate and reliable than any other type of scale. The chances for an error, however, are greater when certain types of scales are used. When weighing hay in drafts of from 1 to 5 bales at a time each draft must be weighed very carefully, for the reason that a great number of drafts are necessary to weigh the amount in a car of hay and an error of only 1 pound on a draft when only one bale is being weighed at a time will amount to from 250 to 350 pounds on a car. If the hay is weighed on wagon scales, where only four or five drafts are sufficient to fill a car an error of 10 pounds on a load would make a total error of only about 50 pounds on a car. It is therefore apparent that the chances of error decrease as the number of drafts decrease. There are other factors, however, which affect the weighing on wagon and railroad scales. Some of these are the failure of the weigher to note whether the same persons or objects are weighed with both the gross and tare weights on wagon scales and the difficulty of obtaining a correct tare weight of cars weighed on track scales.

The convenience or practicability of a certain type of scale may be the principal reason for its use. A baler who must carry his scale with his baling machinery must use a small platform scale. Dealers owning warehouses may also find it more convenient to use platform or dormant scales, while farmers or country shippers who own wagon scales prefer to use that kind.

RELIABILITY OF WEIGHMASTER.

Since the type of scale does not necessarily affect the accuracy of the weights, it is apparent that the efficiency and reliability of the weigher is of great importance. All weighmasters should know enough about the mechanism of a scale to keep it in proper adjustment or at least to know when it is not in proper adjustment. They should know how to do the physical act of weighing properly and how to record the weights accurately and systematically. They should realize the responsibility of their position and should know the loss and trouble any error on their part is likely to occasion.

PROPER RECORDS.

Scales may be properly adjusted and weighers may be accurate and efficient, but if the weights are not properly recorded and the proper

data furnished with them they lose a great part of their value to the interested parties. In the weighing of market hay accurate and complete records of all weighing operations should be made and recorded by every interested party, from the producer to the consumer.

The producer should have an accurate record of the amount of hay baled, so that he can settle his account with the baler and can intelligently offer his hay for sale. If his hay has been weighed on a small platform scale and been tagged, he should record the weights on a tally sheet similar to the one suggested in this bulletin.

WEIGHT CERTIFICATE FOR COUNTRY HAY SHIPPER.

.... 1921.
(Place.) (Date.)

This is to certify that I have weighed correctly and loaded into car .....
(Initial.)

number ..... bales of hay weighing .....lbs.
(Number.)

The hay was weighed and loaded as follows:

Datailed weighing information.					Detailed loading information.		
	Bales.	*Lbs. gross.*	*Lbs. tare.*	*Lbs. net.*		*Brake end.*	*Opposite end.*
1st load....	.....	.....	.....	.....	1st tier.....	....Bales.	.....Bales.
2nd "	.....	.....	.....	.....	2nd "	.... "	..... "
3rd "	.....	.....	.....	.....	3rd "	.... "	..... "
4th "	.....	.....	.....	.....	4th "	.... "	..... "
5th "	.....	.....	.....	.....	5th "	.... "	..... "
6th "	.....	.....	.....	.....	Doorway	.... "	..... "
7th "	.....	.....	.....	.....	Total.....	.....	.....
8th "	.....	.....	.....	.....	Size of bales.	.....	.....
Total.....	.....	.....	.....	.....	Seal numbers	.....	.....

.....
(Weigher.)

Last date on which seals were officially tested .....

FIG. 9.—Form for weight certificate for country shippers.

The country shipper should also have a correct record of the amount of hay bought from each farmer and also of the amount loaded into each car. If the hay is bought from the farmer on tagged weights the shipper should know that the amount marked on the tags represents the current weight of each bale. He should also use some form of tally sheet which will give him an accurate idea of the number and weight of bales bought. If the hay is bought on the condition that it is to be weighed over wagon scales a record should be made of the number of drafts and of the gross, tare,

and net amount of each draft. It would also be well to have the number of bales of each draft recorded on the weight ticket or in the scale book.

When the shipper loads the hay into a car the number of bales in each tier and in the doorway should be recorded, together with the total number of bales and the total weight, and these data should be furnished the buyer of the hay on a weight certificate signed by the shipper or the weigher. (Fig. 9.)

In terminal markets all data relative to the weight should be carefully recorded. These data should include the number of bales found in each tier and in the doorway when the car was unloaded; the total number of whole and of broken bales, together with their total net weight, and the weight of any loose hay; and information as to the condition of the car and seals upon arrival. The number of bales in the tiers and doorway can be used as a check against other counts of the bales and should be given when possible, but is not so important as the total number of whole and broken bales. The latter should always be given, as it is as important as the count of any other commodity where a carload is composed of smaller units.

The official weight certificate has already been described on page 24, and the data which should be given on it are stated there.

Receivers and consumers who weigh the hay received by them should furnish the shipper the same character of information as that suggested for the terminal markets, as all the information mentioned is required in case anyone interested in the hay desires to present a claim to the transportation company or other agency for any loss in weight.

Receivers should always weigh the hay which is received by them in order that they may be sure no loss has occurred in shipment and no error has been made by the shipper.

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